WM194-15 Database Design and Implementation

26/27

Department
WMG
Level
Undergraduate Level 1
Module leader
Jianhua Yang
Credit value
15
Module duration
14 weeks
Assessment
Multiple
Study locations
University of Warwick main campus, Coventry Primary
Distance or Online Delivery

Description

Introductory description

Industries rely on the storage and management of vast amounts of data for their daily operations. Information related to customers, employees, and machinery is typically organised and maintained using a database management system (DBMS). A DBMS enables efficient organisation, easy retrieval, and real-time access to data for operational management. Beyond the basic requirement of data storage, modern DBMSs must also meet increasing demands for efficiency and information security, placing a premium on the development of robust and resilient data systems.

Module web page

Module aims

This module will teach apprentices both theoretical and practical aspects of the design and implementation of database systems. Apprentices will gain knowledge and hands-on experience in data modelling and using database management languages and tools. The current module is based on a programming module and feeds into advanced data processing modules such as data science modules.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Data model,
Three-tier architectures,
Entity-relationship model,
Conversion of binary relationships,
Sub-classing,
Weak entity sets,
Relational model,
Relational data model,
Relational algebra,
Multi- statements transaction,
System constraints,
Queries on multiple tables,
Normalization,
Normalization process,
3rd normal form,
Object-oriented Databases,
Distributed databases,
Client/server Systems,
Data warehouses,
Object-oriented databases,
Conceptual design,
Logical database design,
Physical database design,
Generalization and aggregation,
Data quality,
Data security,
SQL, NoSQL

Learning outcomes

By the end of the module, students should be able to:

- Recall the role of data management systems in managing organisational data and information. [CITP:2.1.1]
- Describe how to use database management systems to perform basic queries to synthesise information and present it concisely. [CITP:2.1.2]
- Apply different data sources, formats, and structures to extract data from different sources. [CITP:2.1.2]
- Describe how to use different database management systems to handle structured and unstructured data, the relevant legal, ethical, social and security standards to a database system solution. [AHEP:4-C6][CITP:2.1.5,2.1.13]

- Reflect on the approaches to data processing, including data modelling and data-driven decision making such as reducing data redundancy. [AHEP:4-C3]

Indicative reading list

Specific reading list for the module

Subject specific skills

Contributes to the occupational standard for Digital and Technology Solutions Professional (ST0119):

Initiate, design, implement and debug a data product for a digital and technology solution (S10).

Apply relevant legal, ethical, social and professional standards to a digital and technology solution (S15)

Extract data from a range of sources. For example, databases, web services, open data (S54).

Transferable skills

Team working, problem-solving, oral and written communication, critical thinking, information literacy.

Study

Study time

Type	Required
Lectures	15 sessions of 1 hour (10%)
Tutorials	15 sessions of 1 hour (10%)
Demonstrations	(0%)
Work-based learning	(0%)
Online learning (scheduled sessions)	(0%)
Online learning (independent)	20 sessions of 1 hour (13%)
Other activity	10 hours (7%)
Private study	30 hours (20%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

- Finishing basic workbook exercises, and spending time on more complex questions
- Expanding the understanding of DBMS in addition to relational databases
- Analysing practical and work-related data sets and problems

Other activity description

- Reading relevant chapters in the module reading list
- Investigations into current database technologies
- Expanding theoretical understanding of ethical and security considerations for database systems

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group D1

	Weighting	Study time	Eligible for self-certification
Database Design	60%	36 hours	Yes (extension)
Database Design – technical drawings of conceptual/logical/physical database modelling, justified and reflected through academic style writing.			
Examination	40%	24 hours	No
In Module Assessment - Computer-based exam using database management tools Reassessment: locally-timetabled examination			

Reassessment component

Examination	No

Assessment group R

	Weighting	Study time	Eligible for self-certification
Database Design	60%	36 hours	No

Feedback on assessment

Feedback will be given as appropriate to the assessment type:
– In Module Assessment: written cohort-level feedback.

– Post Module Assessment: written summative feedback on post module assessment.

Past exam papers for WM194

Availability

Courses

This module is Core for:

- Year 1 of DWMS-H655 Undergraduate Digital and Technology Solutions (Cyber) (Degree Apprenticeship)
- Year 1 of DWMS-H652 Undergraduate Digital and Technology Solutions (Data Analytics) (Degree Apprenticeship)
- Year 1 of DWMS-H653 Undergraduate Digital and Technology Solutions (Network Engineering) (Degree Apprenticeship)
- Year 1 of DWMS-H654 Undergraduate Digital and Technology Solutions (Software Engineering) (Degree Apprenticeship)